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♦ SAFETY ADVISORY BULLETIN ♦

Importance of Preventative Maintenance

On July 10, 1994, a 33,000 dead weight ton, 23-year-old, bulk cargo vessel lost propulsion while outbound in the Strait of Juan de Fuca. The vessel was forced to shut down her main engine because a piston nut that holds the skirt to the crown had worked itself loose, fallen, and was pounding with each stroke of the piston. The vessel was 2.6 miles due south of Beechey Head, British Columbia when the engine was shut down. The vessel was towed to Port Angeles, Washington for temporary repairs.

The engineer on watch first became aware of a problem when he heard a loud knocking noise coming from cylinder number five. The vessel had been underway for approximately eight hours when the noise first occurred. The r.p.m. of the engine was reduced immediately and then varied to determine if the noise changed with speed. When the knocking noise did not diminish, the engine was stopped while still on heavy oil. The turning gear was engaged and the scavenge and crankcase spaces for cylinder number five were opened. A piston nut was found lying on its side in the scavenge space. The nut is part number E345050.

The main engine is a Sulzer 7RD 76, rated at 11,200 horsepower. The pounding of the piston nut caused significant damage to the main engine. A small hole was created in the diaphragm, the support to the telescopic gland for piston cooling water was cracked, and the bolts securing the diaphragm were stripped and damaged because the whole diaphragm was pushed down approximately 3/4 of an inch. In addition, damage was caused to the piston cooling chest in way of the L-shaped connecting parts.

This casualty is common for older engines that have not been properly maintained. Proper maintenance could have prevented this and other similar casualties.

During the casualty investigation, it was discovered that the manufacturers required piston nut locking device was not being used at the time of this incident. The locking device is a disk with a circumferential serrated edge that fits over and mates onto the piston nut. The disk is then fastened to the piston stud with two bolts. A safety plate then fits over the two bolts, which prevents the bolts from coming loose.

In addition, engineers need to be aware of the dangers of using rebuilt parts. Rebuilt parts that have exceeded their cyclic life should not be used as replacement parts. A rebuilt piston stud may be stretched and may no longer meet the original manufacturer specifications. Even a properly torqued piston nut may still back-off under thermal stresses, if it is on a stretched piston stud without a piston nut locking device.

Sulzer manufactured seven to eight thousand of these particular diesel engines twenty to thirty years ago. Thousands of these engines may still be operating today. The RD 76 engine was well-designed with low combustion pressures suggesting that it will last a long time with a little care, but like any system that contains moving parts and is over 15 years old, will begin to experience failures if not properly maintained.

OMS strongly urges each company to review their preventive maintenance policies and procedures for engine overhauls, including the use of piston nut locking devices. Rebuilt parts that have exceeded their cyclic life or no longer meet manufacturer tolerances may contribute to engine failure. Your local Sulzer field representative or Sulzer authorized maintenance contractor can assist you in properly evaluating rebuilt parts and has the latest Information for these particular engines.

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